

WHAT IS CLAIMED IS:

1. A liquid crystal display apparatus comprising:

a light pipe for emitting an incident light coming from said light source from a lower surface via a light emitting means formed on an upper surface;

a reflection type polarizer disposed on the lower surface of said light pipe, said reflection type polarizer dividing an incident natural light into a circularly polarized reflected light and a transparent light, and the reflected light being emitted thorough the upper surface of said light pipe; and

a liquid crystal shutter disposed on the upper surface of said light pipe, and having a liquid crystal cell and at least one sheet of polarizer.

2. A liquid crystal display apparatus according to claim 1, wherein the reflection type polarizer is closely and integrally attached to the lower surface of the light pipe.

3. A liquid crystal display apparatus according to claim 1, wherein the light source can turn on and off light.

4. A liquid crystal display apparatus according

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to claim 1, wherein the light emitting means at least comprises an oblique face and a flat plane, said oblique face in which the light pipe is opposite at its upper surface to the incident side and has the oblique face tilting 35 to 45 degrees with respect to a reference flat plane of the lower surface, and said flat plane in which a crossing angle with the reference flat plane is 10 degrees or less and a projected area with respect to the reference flat plane is 8 times or more of the projected area of said oblique face.

5. Aliquid crystal display apparatus as set forth in claim 1, wherein light emitting means on the upper surface of the light pipe comprises a structure repeating pitches of 50  $\mu\text{m}$  to 1.5 mm of continuous or discontinuous prismatic structures composed of a short side face and a long side face, said short side face comprises an oblique face tilting at tilt angle of 35 to 45 degrees with respect to the reference flat plane of the lower surface from the incident side face toward an opposite edge side, and said long side face falls within tilt angle of more than 0 degree to 10 degrees with respect to said reference flat plane, in which the whole difference in angle is within 5 degrees, difference in angle in relation with a nearest long side face is within 1 degree, and the

projected area to the reference flat plane is 5 times or more of the projected area of the short side face.

6. A liquid crystal display apparatus as set forth in claim 5, wherein the repeating pitches of prismatic structures are fixed.

7. A liquid crystal display apparatus according to claim 5, wherein the short side face of the prismatic structures has the projected width of 40  $\mu\text{m}$  or less with respect to the reference flat plane.

8. A liquid crystal display apparatus according to claim 5, wherein a ridged line direction of the prismatic structures is within  $\pm 35$  degrees with respect to the reference flat plane of the incident side face.

9. A liquid crystal display apparatus according to claim 1, wherein the light pipe passes the incident light from the lower surface at 90% or more of total light transmissivity.

10. A liquid crystal display apparatus according to claim 1, wherein the reflection type polarizer includes at least cholesteric liquid crystal layer.

11. A liquid crystal display apparatus according to claim 1, wherein the reflection type polarizer includes one kind or two kinds or more of multi layer film of double refractive organic film and  $1/4$  wavelength plate.

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12. A liquid crystal display apparatus according to claim 1, including a light diffusion layer of polarization maintaining property between the reflection type polarizer and the liquid crystal cell.

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